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ABSTRACT

The purpose of this investigation was to measure the attitudes of college students across the United States concerning the possible use of genetic manipulation, especially in terms of enhancing human physical and intellectual characteristics. The instrument used was divided into three general areas of inquiry: the first, designed to measure the respondents' personal acceptance of genetic engineering; the second, designed to measure respondents' attitudes toward negative eugenics; and the third, to solicit opinions about which of these college students' social attitudes could influence or provide a rationale for their participation in a genetic engineering program. Also included in the questionnaire was a set of demographic questions to ascertain what, if any, personal background factors influenced the answers of respondents. The results from education, science/technology, and business/law majors are compared. Sections include: (1) "The Human Genome Initiative: The Possible Rebirth of Eugenics"; (2) "Research Assumptions"; (3) "The History of Eugenics"; (4) "Methodology"; (5) "Data and Analysis"; and (6) "Conclusions." (KR)

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PUBLIC ATTITUDES TOWARD HUMAN GENETIC MANIPULATION: A REVITALIZATION OF EUGENICS?

A Paper Presented at the Fifth National Technological Literacy Conference of the National Association of Science, Technology and Society. February 2-4, 1990. Arlington, VA.

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THE HUMAN GENOME INITIATIVE: The Possible Rebirth of Eugenics

Why should we be concerned about a possible rebirth of eugenics? The current successes in genetic engineering of multicellular organisms and the unveiling of the Human Genome Initiative in 1989 bring human genetic engineering closer to a reality (Breo, 1989).

Trial procedures on mice and humans supply strong evidence that manipulation of sperm, eggs, and even whole organisms is feasible (Patrusky, 1989; Temin, 1989). The high degree of success accuracy is unprecedented. For example, gene therapy has been successfully used to abate a virulent cancer in a patient (Marwick, 1989). Additionally, gene transfer between unrelated organisms is a commonplace laboratory activity (Auerbach, 1989). The only limitation to these techniques is knowledge of the organism's genetic material (Griffin, 1985).

The knowledge of the human organism's genetic material, the last essential detail necessary for publicly available "gene therapy" and "gene transfers", will be uncovered by the Human Genome Initiative. Watson proposes that in the next ten years all of the 50,000 to 100,000 human genes will be identified and located (Watson, 1989). Added to the ever perfecting genetic screening and manipulation technologies, it is very likely that humans will soon be selecting or programing simple

traits into fertilized eggs and adults (Roberts, 1989).

Concurrently, studies elucidating the anatomical and physiological bases of behavior will eventually permit the alteration of these genes if desired. Recent medical and psychiatric papers focus primarily on the chemical and physical structure bases of behavior (Barinaga, 1989; Holden, 1987), one of which concerns the probable anatomical network and evolutionary significance of memory (Barnes, 1986).

It seems that within the next ten years people will have the technology and choices available to determine general or specific traits of their offspring; however, the only limitation to using the pending genetic technology is the desire to do so (Flecter, 1989; Haupt, 1990; Kolata, 1986; Shmaefsky & Veglia, 1989).

RESEARCH ASSUMPTIONS

Our study is based upon two assumptions; the first is that the Human Genome Initiative will make available a technology that will become a marketable commodity in American society. The marketable commodity will be a technological means by which we can manipulate genes for the purposes of enhanced physical and possible intellectual traits in our offspring. The second assumption is based upon our capitalistic economic system. Even though the present stated purposes of the Human Genome Initiative will be to "map" the human genetic structure and to allow medical technicians to alter certain genes for the

correction of pathological genetic birth defects, one of the "offshoots" of such a "map" will be the ability for scientists to enhance certain human physical and possibly intellectual characteristics, a potentially lucrative technology in the capitalistic system of present day America.

THE HISTORY OF EUGENICS

The idea of genetic engineering has been with us for a long time. The first controlled selection of desirable traits in plants and domestic animals was accomplished by selective breeding procedures. However, the idea of selective breeding soon spread to encompass humans. At the apex of the Victorian age, prominent Britons and Americans such as Francis Galton, Karl Pearson, Victoria Woodhull, and a few years later Charles Evans Davenport, explained why the Anglo races exhibited a historical superiority that justified their conquests. Rationalizing imperialism, certain literary and scientific enclaves applied quasi historical concepts to advocate ideology in the name of science. History became an instrument useful to defend nationalist ambitions; apparently, according to the eugenicists, the Anglo races simply fulfilled their racial-national-historical destinies by acquiring colonies by force.

The next problem that confronted the now influential imperialists was simple: how to recruit science in order to assist in the preservation of their achievements. Although the debate encompassed many divergent areas, eugenics emerged as a very

promising method of preserving the new status quo. For the new eugenics movement was premised upon the idea "that heredity determined not simply physical characteristics but temperament and behavior as well" (Kevles, 1985:51-75). Victorian

> social engineers determined that regressive, lower-class elements might presume to breed with their civic betters levelling out, in the process, the entire race. Obviously, the best way to forestall such a perceived catastrophe would to restrain undesirables in some manner. Thus, an individual's "DNA matrix soon became an economic and communal force that required political supervision (Heller, 1984:233).

Genetic control began by stressing voluntarism, a positive form of eugenics that was as simple as just saying "no" to one's inferiors. This soon proved to be ineffective and negative eugenics was soon introduced. One half of the American states in the 1920's legalized sterilization for the purposes of keeping "idiots, criminals, epileptics and white slavers out of the gene pool" (Neuhaus, 1988:17). Coincidentally, lawmakers imposed another example of negative eugenics in 1924 with the passage of the Immigration Act, a legislative attempt to keep unworthy races from entering America. Well into the 1930's even the use of abortion in certain instances, in the name of social progress, was considered by many conservative eugenicists as "necessary though crude and unseemly" (Selden, 1983:181). However, it was the eugenic policies of Adolph Hitler that eliminated any justification for state enforced eugenics after 1945.

Nevertheless, throughout the post WWII period, but particularly during the last five years, an impressive coterie of scientists, businessmen, editorial writers, bureaucrats and even patent lawyers have expressed enthusiasm for eugenic types of genetic research. Observing this trend, Congress appropriated fifty-three million dollars to human genetic research (Elmer-Dewitt, 1989:63). When testifying on the subject to Congress, Dr. James Watson affirmed: "We can have at our disposal the ultimate tool for understanding ourselves at the molecular level ... the time to act is now" (Elmer-Dewitt, 1989:63).

METHODOLOGY

At first, this new technology will only be available to a small segment of our population because of its potentially high cost. However, as with all new technology, when techniques become more refined and acceptance of genetic manipulation becomes more widespread, costs will come down. But even when the cost begins to decline, the technology will not become affordable to "every" citizen, most notably working class people of low income, or welfare recipients. Upon the basis of the above mentioned assumptions, our research focuses upon college students, that particular segment of the American population who are of reproduction age and who can afford the expenses incurred by the use of genetic manipulation within a relatively short time after graduation. College students will make more

money in their lifetimes than the rest of their age cohort, and should have access to more of the information regarding the actual capabilities of the genetic technology than their non-college educated peers. Thus, the goal of our research is to measure the attitude of college students across the nation about their possible use of genetic manipulation, especially in terms of enhancing physical and intellectual characteristics.

Our instrument, is divided into three general areas of inquiry, the first area is designed to measure the respondents personal acceptance of genetic engineering. A proposal with six accompanying statements was presented to the respondents. The proposal stated:

> Given new genetic technologies that would make it possible to start up a program in which mental or physical genetic deficiencies could be corrected before conception, and performed at a reasonable cost,

The six phrases that completed the above statement were then presented. A five point Likert Scale, starting with (1) designating Strongly Disagree through (5) Strongly Agree, was offered as a method of rating those six propositions. The propositions included a personal commitment to participate in such a program, the possibility of their requesting an increase in intelligence, an increase of muscle density/configuration or other physical characteristics, and perhaps of selecting preferred cosmetic traits such as hair and eye color. The respondents were also asked to give their opinion about the possible

termination of a pregnancy if the unborn child were found to have a genetic defect.

The second portion of our instrument was designed to measure the respondents' attitude toward negative eugenics, the sanctioning of people who were found to have non-correctable genetic defects. Again, on a Likert Scale, of (1) Strongly Disagree to (5) Strongly Agree, respondents were asked whether marriage should be allowed for people with known uncorrectable genetic defects, whether marriage should be allowed but offspring denied, or whether these people should be sterilized so they could not reproduce under any circumstance.

The third section of our questionnaire solicits opinions about these college students' social attitudes that could influence or provide a rationale for their participation in a genetic engineering program. The five-point rating format was retained, and the respondents were asked questions relating to possible increased social welfare from a program of genetic engineering. Positive answers obtained from these questions would also indicate the percentage of college students who believed that at least some social behavior is genetically based. The students were asked if they believed that society in general would benefit from these smarter, healthier "engineered" children. They were also asked to rate the statements that society would find these "enhanced" children easier to raise, if they felt there would be less crime, fewer mental problems, and if the overall economy would benefit from the offspring of

a genetic engineering program.

To ascertain what, if any, personal background factors influenced the answers of the respondents, a set of demographic questions was included in the instrument. The students were asked their age, gender, racial heritage, family income, class standing (freshman etc.), religious affiliation, academic major, and their father's and mother's occupation.

Our sample of college students is stratified with a random selection. The country was divided into zones, universities and colleges within those zones were then assigned a number. A random set of numbers was then computer generated for each zone, and the matching schools were chosen. Colleagues at the selected schools were then contacted and asked to administer the instrument to their intro-level classes. If faculty at these schools refused to participate, we randomly selected another school in that particular zone. We requested intro-level classes in disciplines that fulfilled university "core" curriculums so that no particular group of students would be over represented.[1] The criteria used for stratification was U.S. time zones. In each time zone, we solicited a northern and southern sample of about 200. Presently, we have received 935 completed questionnaires. Using an inductive form of data analysis, we discovered that the data has yielded some significant patterns .

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1) Our sample matched the percentages of Planned Freshman Majors for 1989 as published by the American Council on Education at UCLA.

DATA & ANALYSIS

When asked if, as prospective parents, the students would welcome a program in which they could correct genetic deficiencies 74.1% of the sample answered agree or strongly agree, males agreed at a 72.7% and females at a 75.2% rate. Still, when asked about the enhancements of various physical or intellectual characteristics, the acceptance rates declined (see TABLE 1). Table 1 illustrates that although an overwhelming

TABLE 1. Respondents That Agreed Or Strongly Agreed With Personal Acceptance Questions In Percent

	V1	V2	V3	V4	V5	V6
Males	48.6	72.7	19.2	40.1	33.9	19.2
Females	48.9	76.4	14.3	28.7	21.3	14.0
Male & Female Combined	48.6	74.1	16.8	33.8	27.1	16.3

The questions listed below are based on the availability of a genetic engineering program as described in the above text.
V1 Prospective parents who did not participate in such a program would be foolish.
V2 As a prospective parent I would welcome such a program.
V3 If an unborn child were tested and found to have genetic defects, the prospective parents should terminate the pregnancy and try again.
V4 Were it possible to increase the intelligence of the unborn child, as a prospective parent I would be foolish not to have it done.
V5 If it were possible to increase the muscles or related physical characteristics of an unborn child, as a prospective parent I would be foolish not to have it done.
V6 Were it possible to select skin tone, hair color, eye color or appearance before conception, I would consider having it done.

majority of college students admit they would participate in a program of genetic engineering for their offspring, they are

not as willing to commit to enhancement engineering of physical or cosmetic characteristics. However, males show more of a tendency to consider genetic manipulations to improve intellectual, physical and even cosmetic characteristics than females. Males, by a rate of 5% over females, also believe that an abortion would be preferable if their offspring were diagnosed to be genetically deficient.

When addressing the issue of sanctioning people diagnosed as carriers of incurable genetic defects, the response was an overwhelming "NO" (see TABLE 2). Although males are shown to

TABLE 2. Respondents' Attitudes Toward Sanctions Of Carriers Of Genetic Deficiencies by Percentage Of Those Who Disagreed Or Strongly Disagreed

	V7	V8	V9
Male	85.8	67.1	79.1
Female	90.2	75.4	80.9
Male & Female Combined	88.3	71.6	80.1

Questions V7 through V9 are based upon a statement in the questionnaire proposing that people with non-correctable genetic defects be sanctioned:
V7 Individuals found to have those genetic defects should not be allowed to marry.
V8 Individuals found to have those genetic defects should be allowed to marry but not to have children.
V9 Individuals found to have those genetic defects should be sterilized, whether they were married or not, so that they could not have children.

be more willing to sanction carriers of uncorrectable genetic deficiencies, the table shows that there is very little tolerance for support of a social policy that would sanction a

person that carried deficient genes.

The final five questions were designed to measure the respondents' rationale for either their acceptance or rejection of a genetic engineering program (see TABLE 3.). The data

TABLE 3. Respondents Answering Agree Or Strongly Agree To Questions of Rationale in Percent

	V10	V11	V12	V13	V14
Male	43.6	32.5	14.5	27.9	37.9
Female	30.5	17.7	10.7	20.4	26.4
Male & Female Combined	36.3	24.4	12.4	23.7	31.5

The questions dealing with rationale were based upon the statement that if such a program were implemented in our country:
V10 Society would benefit because of the greater number of healthier, smarter people.
V11 Raising children would become easier with healthier, smarter children.
V12 The general public would be safer, and there would be less crime with the greater number of healthier, smarter people.
V13 Society would benefit because there would less need for mental hospitals.
V14 The economy would benefit from such a program because these people of higher intelligence would develop new technologies.

indicates that while the acceptance of the proposed rationale was not high, about 10% more males than females seem to hold the assumption that at least some social behavior is genetically based. These findings offer a partial explanation for males' apparent acceptance of genetic engineering.

Upon cross-tabulation of questions V1 to V14 with the demographic variables, we found a significant correlation between gender and the questions (V4 to V6) pertaining to the selection of intellectual and physical traits. Only one other variable

correlated significantly with these three trait selection questions: the students' choice of academic major.

While none of the (R scores) were very high, all tested at high levels of significance (.034 or less). Nevertheless, it was the correlations that emerged between gender and academic major when the questions V10 to V14 were held as the dependant variables to questions dealing with the respondents' belief in the social benefits of genetic engineering that caught the interest of the researchers (see TABLE 4). The statistically significant positive correlations, shown in Table 4, have a great deal of impact because of the manner in which the variable "academic major" was coded. The respondents who were assigned a value of 5, 6, and 7 were students who had already declared or were considering a major in Education (coded 5), Science/ Technology (coded 6), and Business/Law (coded 7). The social implications implied by a positive acceptance of the attitudes indicated by these variables (V4-V6 and V10-V14) by people who in a few short years will be the teachers, scientists, and business leaders of our country is far reaching.

It is recognized that the people who set a majority of the norms and values in American society are either members of the scientific community, people in high profile business positions, and, of course, those in the legal profession from which the majority of our political representatives come. We also need to acknowledge that our public schools have the mission of not only to educate our youth but to socialize them as well.

TABLE 4. Pearson R Correlation Coefficients Between Variables GENDER & ACADEMIC MAJOR Holding Questions V4-V6 & V10-V14 As Dependant

	GENDER	MAJOR
V4	R =.16 Sig=.000	R =.07 Sig=.015
V5	R =.19 Sig=.000	R =.06 Sig=.034
V6	R =.15 Sig=.000	R =.07 Sig=.015
V10	R =.15 Sig=.000	R =.14 Sig=.000
V11	R =.18 Sig=.000	R =.10 Sig=.002
V12	R =.12 Sig=.000	R =.12 Sig=.000
V13	R =.15 Sig=.000	R =.10 Sig=.001
V14	R =.10 Sig=.002	R =.14 Sig=.000

Gender is coded Female = 1 Male = 2
Major is coded Humanities = 1 Social Sciences = 2
Art = 3 Nursing = 4 Education = 5
Science/Technology = 6 Business/Law = 7

Despite the progress made by women in the last three decades, introductory sociology textbooks remind us that the United States is still a male dominated society, and that most of the major decisions made on a macro societal level are being made by males.[2] Therefore the acceptance of genetic engineer-

2. See (Eitzen, 1989:167-185)

ing we discovered in males who will probably hold the societal positions that have the ability to influence our social values carries significant implications.

After selecting the respondents by gender, who were majoring in the above mentioned three academic areas of study, we submitted these variables to another cross-tabulation with the dependant variables that had tested significant in Table 4. By selecting only education, science/technology, and business/law majors, we can see in TABLE 5 that no significant correlations occur. The lack of significant correlations indicates that acceptance scores for the dependant variables do not increase as scores move upward from education to science and technology

TABLE 5. Pearson R Correlation Coefficients For Variables V4 to V6 & V10 to V14 Dependant With Education, Science/Technology, and Business/Law Majors By Gender

	V4	V5	V6	V10	V11	V12	V13	V14
MALES								
R =	-.00	-.04	.02	.07	.09	.00	.05	.04
Sig =	.47	.21	.33	.10	.05	.48	.18	.22
Females								
R =	.07	.07	.07	.03	.09	.00	.05	.02
Sig =	.11	.09	.09	.31	.04	.49	.46	.34

students and finally to the business and pre-law majors. This indicates that there might be a similarity both in attitudes toward as well as the rationale for genetic engineering existing in the minds of college students who major in these areas. However, the actual percentages of the education, science/technology, and business majors who agreed with the personal

characteristic selection questions V4 to V6 does not differ significantly from those of the total sample. However, the questions pertaining to social justifications for acceptance of genetic engineering (V10 to V14) show about a 2-3% increase over the total sample scores (see TABLE 6).

TABLE 6. Total Respondents Answering Agree Or Strongly Agree To Questions of Rationale Compared to Responses Of Education, Science/Technology, and Business/Law Majors in Percent

	Total Sample			Ed/Sci/Bus Sample		
	MALE	FEMALE	M&F	MALE	FEMALE	M&F
V10	43.6	30.5	36.3	44.0	34.0	39.0
V11	32.5	17.7	24.4	34.8	17.3	26.3
V12	14.5	10.7	12.4	15.8	10.8	13.3
V13	27.9	20.4	23.7	27.8	19.3	28.4
V14	37.9	26.4	31.5	39.8	28.4	34.1

Further isolating the answers by specific majors (see TABLE 7), we find that males majoring in education score below the total sample mean except on question V12. They belive that public safety would improve with genetically engineered children, indicating an acceptance of a genetic base for deviant behavior higher than the sample average. On the other hand, female education majors show significantly lower scores than the sample average for the rationale questions V10-V14. The combined totals show that education majors in general have a

lower propensity to participate in characteristic selection than the sample average. As far as education majors are concerned, the only variable that they exhibit higher scores is the males on V12 indicating a somewhat higher propensity to feel that crime is somehow genetically based than the rest of the sample.

Upon examination of the data for the science/technology

TABLE 7. Respondents Who Agreed To V4-V6 & V10-V14 By Education, Science/Technology & Business/Law Majors, Independently in Percent

MAJOR:	V4	V5	V6	V10	V11	V12	V13	V14
EDUCATION								
Males	37.5	32.1	8.9	37.5	26.8	19.7	26.7	29.4
Females	19.9	14.7	11.8	26.4	12.5	9.5	15.5	23.6
M & F	28.7	23.4	10.4	32.0	19.7	14.1	21.1	26.5
SCI/TECH								
Males	42.1	31.2	18.8	46.9	32.1	17.9	26.6	39.1
Females	42.6	29.7	21.3	44.7	22.3	12.8	25.6	28.7
M & F	42.4	30.5	20.1	45.8	27.2	15.4	26.1	33.9
BUS/LAW								
Males	43.8	36.3	18.7	44.6	40.5	12.4	28.9	46.3
Females	27.0	24.3	18.0	34.2	20.7	10.8	18.9	34.2
M & F	35.4	30.3	18.4	39.4	30.6	11.6	23.9	40.3
TOTALS FROM TABLES #1 & #3								
Males	40.1	33.9	19.2	43.6	32.5	14.5	27.9	37.9
Females	28.4	22.0	14.0	30.5	17.7	10.7	20.4	26.4
M & F	33.8	27.1	16.3	36.3	24.4	12.4	23.7	31.5

majors, we observe a large increase in both the propensity of these people to accept a program of genetic engineering personally, and a belief that such an engineering program would prove

to be an overall benefit for society. The "across the board" higher acceptance of these propositions (V10-V14) by the science/technology majors was anticipated by the researchers. We realized that these people believe in technology's ability to provide answers for many of our problems. However, we noticed an important difference from the rest of the sample: the similarity of male and female responses from this group. Females scored higher than the combined sample average on the propensity to choose an enhancement program for their future offspring (V4-V6). The female science/technology majors also scored within three percentage points of the males on variables V11 to V14. They surpassed the combined sample average for variable V10 by 8% indicating a belief in the benefit of the offspring of an engineering program for society in general.

Business/law majors constitute the largest group of the sample. They comprise 24.8% of the sample. Examination of the data from these business or law majors, shows that males in this group are in favor of a personal genetic program by approximately 10% over the national sample average. With the exception of variable 12 (the crime variable), they feel that society would benefit in the above mentioned categories as much as 15% more than the national combined sample. Female respondents in this group display a tendency to score lower than the total sample except in the areas of selecting cosmetic characteristics and in their belief that engineered children would benefit the economy. The data shows that, as a group, these

business/law majors seem more inclined to become personally involved with a program of genetic engineering than any other "major" with the exception of the science/technology sample.

The aggregate data shows us that about 43% of the science/technology, and overall about 40% of male college students favor genetic engineering for the purposes of intelligence enhancement. Approximately 34% of our college students in general would consider enhancement of physical traits. About 46% of the males majoring in science/technology and business/law feel that genetically enhanced children will be have a positive influence on society. Approximately 44% of the males in every major seem to feel that society will benefit from a program of genetic enhancement.

There is one final pattern we discovered that can have important social consequences. We found a significant number of respondents who answered (3) or neutral to the questions pertaining to either the personal acceptance or rationale for accepting the idea of genetic engineering (see TABLE 8). The mean average of neutral answers to the questions listed in Table 8 is 26.3%; which represents people who are undecided as to the value of picking specific enhancements at this point in time. Nor are these respondents quite sure as to the value to society or even lack of value of genetically engineered children. However, if only 50% of the college students who are now neutral were converted to a positive attitude toward genetic engineering through either a good advertising campaign or media

TABLE 8. Percentages Of Respondents That Answered Neutral To Questions V4 To V6 & V10 To V14

	V4	V5	V6	V10	V11	V12	V13	V14
M & F	24.4	25.5	19.3	28.3	25.0	22.6	30.2	34.9

exposure of some "engineered" children who displayed enhanced desired traits, then a market of about 50% of all college graduates could be established for such a program. The social implications of such a potential market could be enormous.

CONCLUSIONS

Upon the basis of the fairly high levels of acceptance of a genetic enhancement program discovered in our male college students, certain questions emerge about social class structure. Would we be developing a "permanent underclass" or even possibly a "caste class" of people if they were not genetically engineered? Caste is defined as holding no chance of upward mobility in the caste member's lifetime. How would the realization that they were a less intelligent or physically fit individual affect the motivations of non-engineered children? Researchers report the loss of incentive in the offspring of generational welfare recipients (Banfield, 1974: 234-235). However, the progeny of these welfare parents are constantly told that they can better themselves, because they are equal to the segment of society that has prospered. Will non-engineered

children feel that they would not stand a chance for success if they had to compete with genetically enhanced children?

Leaving ethical considerations aside, as members of the scientific community forethought must be given to the average citizen who will not be able to afford a program of genetic enhancement. If we do not include this segment of our population by allowing them to participate in such a program, we run a risk of greatly increasing our social problems in one generation. For if a class/caste structure were developed and a feeling of inadequacy became entrenched in the non-engineered class, would that not pressure these excluded members of society to attempt deviant methods of escapism? In all likelihood, the children of the people who cannot afford genetic enhancements will become the alcoholics and drug abusers of tomorrow.

The double jeopardy of an increase in social problems is that the costs of fighting these problems will fall upon those who are not benefiting from a genetic engineering program to begin with, the average working class citizen. They will be asked to bear the costs that can be incurred for rehabilitation from alcohol or other forms of drug abuse. The working class would also be expected to bare the costs incurred from counseling services, even public funded mental health centers. These mental health centers charge a fee based upon an individual's income scale. Costs such as these can seriously cut into a person's disposable income necessary for subsistence when income is low.

Another facet of a genetic engineering program that warrants further investigation is the almost incomprehensible effects that a large influx of superior intellects would have on our educational institutions. How would we supply enough stimulus for the above average students, and what would we do with the non-enhanced students? As noted above, what if these non-enhanced children lost a degree of ambition because they felt inadequate? What would that do to our drop-out rates in high school? What would that do to future college enrollment? These are but a few of the possible changes within American society that could occur from a program of genetic engineering if we do not explore all of the possible consequences of such a program.

In the United States, the responsibility of considering these possible effects is not placed with the vendors of the technology. As members of a capitalistic society, they are free to extol the possible benefits of their services. The responsibility then must rest in the hands of the scientific community to first educate the public of the capabilities of the new technology and then to inform them of the possible latent functions of the implementation of a technology such as the Human Genome Initiative is capable of developing.

In conclusion, we stress the need for further research in the area of the social acceptance of genetic engineering. We intend to continue to do research on this subject involving both a reliability re-sampling of college students and other

publish and otherwise inform the public of our findings. We hope that our information will offer the members of society an alternative and objective perspective of the possible "side effects" of the Human Genome Initiative.

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